arcola theatre on ashwin st / sustainability

In 2007 we commissioned a **Feasibility Study** on making our old building **Carbon Neutral.** The outcome was that it was feasible, but would require a lot of work to the building. As our lease was about to expire we focused our efforts on what we could achieve through changing our operations and promoting sustainable lifestyles.

Now we are refitting a building we have the opportunity to implement all the things we have learned and work towards the carbon neutral theatre so much discussed.

The notes below outline some areas of particular interest and relevance to the refitting (rather than operations) of the building:

Minimise embodied carbon –emissions from the creation of the building. Our rough and ready aesthetic fits this approach well.

- Minimise the amount of building required – don't change things if you don't need to.
- Maximise recycling of locally sourced materials – re-use what is already there.
- Don't specify materials or finishes which are carbon intensive to make, fit or maintain.

Minimise electricity consumption

Lighting

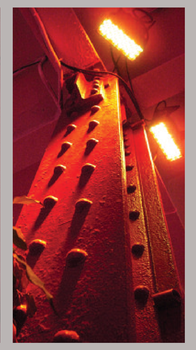
- Natural lighting is generally 'better' – making sure we have access to it will be a key concern for studio window designs
- Low energy lighting is something we have been working on a lot. Since our first trials on the main stage in 2007, low energy LED lights have been become far more practical and cost effective for virtually all applications. Expect to see a large portion of the building lit by LED

Ventilation & Air Conditioning

- Air conditioning (cooling) is bad news; and it so often makes as many people uncomfortable as comfortable. We won't have any. We will instead be looking at ways to draw in cool air from the basement and store this 'coolth' in the brickwork of the auditoria.
- Ventilation is generally driven by electric fans. Natural ventilation is possible for auditoria but is not trivial to install in an existing building; we do have a chimney which is a good start, but there is a lot more work required.
- Fitting a heat exchange ventilator is important to recover heat from waste air in the winter.
- Ventilation should be controlled so that it is active for the shortest possible time.
- Ventilation for offices and rehearsal spaces can be achieved through opening windows most of the year around.

Electrical devices

- Computers, fridges, etc can be selected on the basis of energy consumption, switched off over night and used selectively – does everyone want ice cold water?



Minimise heat (gas) consumption

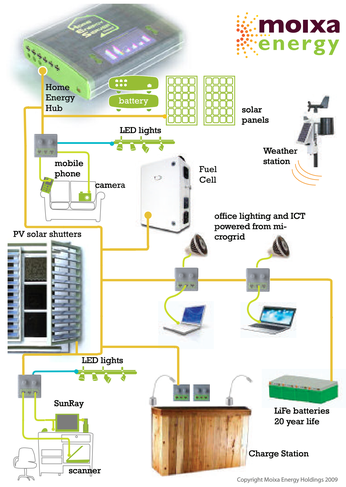
- Controlling heat loss is not easy in old industrial building as the walls are solid brick and the windows are single glazed metal frames. The first solution therefore is to minimise the time when it matters – for six months of the year we turn off the heating in much of our existing building as sufficient comfort can be achieved by adding/removing clothes.
- Double glazing is essential. We hope to fit internal double glazing so that we can preserve the original windows. We will be looking for a system which provides sound-proofing, black out, thermal insulation and can be opened.
- Insulating the walls greatly reduces heat loss, but takes up space, ruins the industrial aesthetic and prevents the walls from serving as a store of heat or coolth. There is much consideration still to be given to this matter, but we expect that it will be done selectively – in the dressing rooms and offices for instance where people are sitting and need to be kept warm but not in the auditoria which are used for shorter periods and where we are more concerned about preventing overheating during performances.

Manage waste

- The dream is zero waste to landfill. It is possible in some businesses, probably not in theatre, but as a guiding principle is it powerful – everything which comes in must go out – so think carefully about what you bring in.
- Waste to energy is of great interest. Burning it is tricky, but bio-gas digestion is very interesting as it turns organic waste in to compost and gas, giving truly carbon neutral energy and in the process eliminating a waste-stream.

Putting it all together – onsite power generation, DC distribution, monitoring & control

- Onsite low carbon power generation is a planning requirement for certain types new buildings. It is not a requirement for **Arcola Theatre** but is of huge interest to us as it will allow to see and optimise the whole picture.
- We will be bringing with us our 5kW fuel cell from Arcola Street, and this time we will be designing the whole building's electrical system around its 48V DC output by means of a DC microgrid.
- Lots of energy is lost in the power supplies to most electrical devices. These devices run on low voltage DC power (like that from a battery) but are plugged in to the mains which provides high voltage AC power. A DC microgrid distributes DC power to DC devices, e.g. LED lighting, computers, phones, etc.
- And since low voltage DC can't kill anyone, it will be much cheaper and easier to install which means we can evolve the system as we change our habits.
- Monitoring power consumption is the key to reducing waste and learning where we can make positive choices to reduce our consumption. Advanced electrical installations also facilitate better controls, so no more leaving the rehearsal room lights on.
- The other advantage of onsite power generation is the ability to recover waste heat from the generator which can be fed straight in to the building.



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